

Research Article

Correlates of Dual-Method Contraceptive Use: An Analysis of the National Survey of Family Growth (2006–2008)

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Objective. To analyze a nationally representative sample of women for correlates of dual-contraceptive-method use. **Materials and Methods.** We conducted an analysis of the National Survey of Family Growth, 2006–2008, a cross-sectional survey of reproductive-aged women in the United States. **Results.** Dual method use was reported by 7.3% of the 5,178 women in the sample. Correlates of higher rates of dual-contraceptive-method use included age younger than 36 years and nonmarried marital status. Lower rates of dual method use were observed for women with less than a high-school education and women without consistent health insurance in the past year. Compared to women using oral contraceptives, use of the contraceptive injection or long-acting reversible contraception was associated with lower dual-method use. **Conclusions.** The overall rate of dual-method use in the USA is low. Future interventions to promote dual method use should target high-risk groups with modifiable risk factors.

1. Introduction

Sexually transmitted infections (STIs) and unintended pregnancy are important and costly public health issues. The United States has an estimated incidence of 19 million cases of STIs each year which incurs \$15.9 billion in cost to the health care system [1, 2] and unintended pregnancy rates continue to hover at nearly 50% [3]. One proposed strategy to reduce the risks of unintended pregnancy and STI is the promotion of dual-contraceptive-method use. Dual-method protection includes use of a highly effective pregnancy prevention in conjunction with a barrier (e.g., male condom). The male condom is the most commonly used method of sexually transmitted infection (STI) prevention, whereas the oral contraceptive pill and female sterilization are the most common methods of pregnancy prevention in the USA [4].

The burden of unintended pregnancy and STIs is greater among younger and economically disadvantaged men and women [3, 5]. While nearly all women report having used birth control and most have used a condom [4], dual-method use is relatively uncommon. An analysis of the Youth Risk Behavior Surveillance System (YRBS) noted 6.6% of

young women using oral contraceptives also used a condom at last intercourse [6]. According to another study of the YRBS, use of dual-contraceptive methods increased from 3.2% in 1991 to 7.2% in 2001 [7]. A more recent publication reviewing data from the National Longitudinal Study of Adolescent Health noted 14–25% of participants report using dual methods at last intercourse [8].

Most of the previous research focused on adolescents or other populations who carry greater risk of both unintended pregnancy and STI acquisition than the general population. Therefore, we sought to evaluate correlates of dual-method use in a national sample of reproductive-aged women.

2. Materials and Methods

We examined data from the 2006–2008 National Survey of Family Growth (NSFG). The NSFG is a cross-sectional survey conducted by the National Center for Health Statistics (NCHS) at the Centers for Disease Control and Prevention and is a survey of family life, marriage and divorce, pregnancy, infertility, use of contraception, and men's and

TABLE 1: Contraceptive methods used in the last intercourse in past 12 months by nonpregnant females aged 15–44 years, $N = 5178$.

Method	N (%) [†]	Dual	Single
Any method of contraception			
Yes, dual	448 (7.3)		
Yes, single	3341 (68.0)		
No	1389 (24.7)		
Type of contraceptive method			
Nonbarrier methods*	2694 (55.7)	448 (13.1)	2246 (86.9)
Pills	1125 (22.3)	280 (21.7)	845 (78.3)
Sterilization/partner sterilization	1004 (24.1)	78 (4.4)	926 (95.6)
Injectables (Lunelle/Depo-Provera)	211 (2.8)	47 (16.7)	164 (83.3)
LARC	229 (4.6)	16 (3.3)	213 (96.7)
Patch	55 (0.6)	7 (16.0)	48 (84.0)
Ring	100 (2.1)	22 (32.6)	78 (67.4)
Barrier methods	1543 (26.8)	448 (27.1)	1095 (72.9)

* Individual methods do not sum to % of Nonbarrier methods as respondents may have reported >1 Nonbarrier method at last intercourse.

[†] Weighted percent.

women's health [9, 10]. The survey is a national probability sample of individuals living in households and oversamples Blacks, Hispanics, teens, and females. The NSFG was conducted from 2006 to 2010 with 110 areas (primary sampling units) selected. Each year a nationally representative subsample of areas was interviewed. Interviews were conducted by the University of Michigan's Institute for Social Research by trained female professional interviewers in the homes of participants using computer-assisted personal interviewing. Interviews lasted on average 80 minutes.

There were 7,356 women between the ages of 15 and 44 years of age interviewed between July 2006 and December 2008. Our analysis included 5,178 women who represent the experiences of approximately 44.5 million women in the United States. We excluded women who were currently pregnant, have had a hysterectomy, had no sexual partners, or reported only female sex partners and therefore not at risk of unintended pregnancy (see Figure 1). We determined current contraceptive method based on respondents' answers to a single question regarding "contraception method used at last intercourse in the past 12 months [11]". Respondents could provide up to four methods in response to this question allowing for estimation of dual-method use.

We calculated the prevalence of dual-method contraceptive use and evaluated demographic and reproductive characteristics that might be associated with dual-method use. Potential predictors of dual-method use included age group (15–20, 21–25, 26–30, 31–35, 36–40, 41–44 years), gravidity, marital status (married, living with partner, widowed/divorced/separated, never married), race (black, white, other), Hispanic ethnicity, highest level of education (less than high school, high school, some college, or college graduate), continuous insurance coverage for all of the prior 12 months, and number of lifetime and past year sexual partners.

In order to focus on correlates of dual-method use we used all respondents who did not report dual-method use

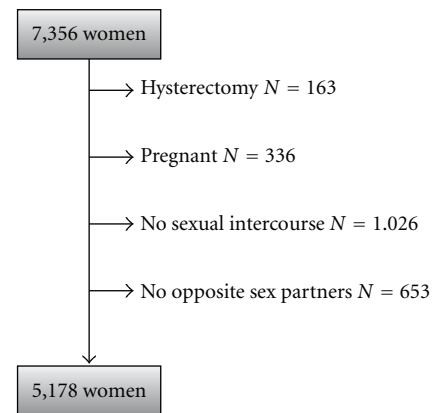


FIGURE 1: National Survey of Family Growth (2006–2008) Analytic Sample.

(including single-method users and respondents using no method) as the referent. After evaluating univariate associations using logistic regression, we used a multivariable logistic regression model to assess independent predictors of dual-method use. Our model included the factors found to be associated with dual-method use in the univariate analysis. Reference groups for the multivariable regression were chosen by lowest rate of dual-method use, by clinical judgment or the category with the largest number of respondents.

For our examination of the association between primary method of contraception and dual-method use, we compared dual-method use to single-method use and excluded those participants not using a primary contraceptive method ($n = 1,389$) or using barrier only method ($n = 1095$), as these women were not eligible for the outcome of interest. "Pill users" included combination and progestin-only oral contraceptives. Users of the transdermal contraceptive patch

TABLE 2: Summary of participants' characteristics by number of methods used.

	All non-pregnant women 15–44 years (<i>N</i> = 5178)	Dual (<i>N</i> = 448)	Single (<i>N</i> = 3341)	None (<i>N</i> = 1389)	<i>P</i> value
Age					<0.0001
15–20	731 (11.7)	134 (22.8)	438 (56.9)	159 (20.3)	
21–25	976 (16.6)	124 (12.0)	595 (63.4)	257 (24.6)	
26–30	1114 (18.4)	79 (5.1)	735 (65.9)	300 (28.9)	
31–35	923 (18.5)	62 (5.2)	598 (67.5)	263 (27.2)	
36–40	853 (19.5)	32 (1.8)	565 (73.1)	256 (25.1)	
41–44	581 (15.2)	17 (2.3)	410 (77.9)	154 (19.8)	
Race					<0.0001
Black	1111 (15.1)	122 (9.4)	662 (61.6)	327 (29.0)	
White	3499 (73.6)	301 (7.4)	2320 (69.8)	878 (22.7)	
Others	568 (11.3)	25 (3.3)	359 (64.5)	184 (32.2)	
Ethnicity					0.0049
Hispanic	1124 (16.5)	63 (4.2)	724 (66.1)	337 (29.7)	
Non Hispanic	4054 (83.5)	385 (7.9)	2617 (68.4)	1052 (23.8)	
Education					0.0003
Less than HS	1088 (17.1)	96 (6.7)	672 (61.1)	320 (32.2)	
High School	1388 (25.8)	116 (7.2)	860 (67.0)	412 (25.9)	
Some College	1123 (20.9)	125 (12)	724 (66.5)	274 (21.5)	
College Graduate	1579 (36.2)	111 (4.9)	1085 (72.9)	383 (22.2)	
Marital Status					<0.0001
Married	2181 (53.3)	47 (1.6)	1461 (72.4)	673 (26.0)	
Living with Partner	693 (13.2)	37 (6.1)	448 (64.4)	208 (29.5)	
Widowed/Divorced/Separated	520 (8.0)	63 (9.8)	319 (63.3)	138 (26.9)	
Never Married	1784 (25.5)	301 (18.9)	1113 (62.2)	370 (18.9)	
Gravidity					<0.0001
0	1539 (28.4)	240 (16.0)	959 (63.8)	340 (20.2)	
1–2	1973 (37)	116 (4.3)	1271 (69.0)	586 (26.7)	
3+	1666 (34.6)	92 (3.3)	1111 (70.4)	463 (26.4)	
Health insurance in the last 12 months					<0.0001
Insured continuously	3630 (71.2)	345 (8)	2385 (70.1)	900 (21.9)	
Uninsured at some time	1535 (28.8)	103 (5.6)	947 (62.4)	485 (32)	
# Lifetime Sexual Partners					0.0008
1	1109 (24.3)	64 (4.9)	764 (72.4)	281 (22.7)	
2–3	1165 (22.9)	110 (9.4)	750 (68.5)	305 (22.1)	
4–9	1851 (34.5)	179 (7.7)	1196 (67.9)	476 (24.5)	
10 or more	1053 (18.3)	95 (7.0)	631 (61.6)	327 (31.3)	
# Sexual Partners in last 12 months					0.0045
1	4316 (86.9)	302 (5.8)	2829 (69.1)	1185 (25.1)	
2	529 (8.2)	94 (18.9)	322 (58.6)	113 (22.5)	
3+	333 (4.9)	52 (13.8)	190 (63.5)	91 (22.7)	
Desires pregnancy in the future					<0.0001
Yes	3153 (55.9)	321 (10.1)	1852 (59.0)	980 (30.9)	
No	1892 (41.3)	118 (3.8)	1396 (79.1)	378 (17.1)	

TABLE 3: Crude and adjusted odds ratios (and 95% confidence intervals) for dual versus non-dual-method use.

	Crude	Adjusted
Age		
15–20	16.3 (9.38–28.5)	7.01 (3.19–15.4)
21–25	7.40 (3.68–14.9)	3.93 (1.90–8.10)
26–30	2.94 (1.69–5.11)	2.36 (1.29–4.31)
31–35	3.04 (1.61–5.74)	3.14 (1.72–5.76)
36–40	Referent	Referent
41–44	1.27 (0.55–2.94)	1.33 (0.57–3.10)
Race		
Black	1.30 (0.87–1.93)	0.97 (0.66–1.44)
White	Referent	Referent
Others	0.43 (0.26–0.72)	0.43 (0.25–0.75)
Ethnicity		
Hispanic	0.52 (0.34–0.79)	0.73 (0.48–1.13)
Non Hispanic	Referent	Referent
Education		
Less than HS	1.41 (0.94–2.11)	0.47 (0.27–0.81)
High school	1.49 (0.94–2.37)	0.94 (0.55–1.58)
Some college	2.61 (1.69–4.02)	1.07 (0.73–1.57)
College graduate	Referent	Referent
Marital status		
Married	Referent	Referent
Living with partner	3.83 (2.08–7.04)	2.87 (1.62–5.07)
Widowed/divorced/separated	6.45 (3.40–12.3)	7.86 (4.05–15.3)
Never married	13.9 (9.32–20.8)	6.45 (3.62–11.5)
Gravidity		
0	5.58 (3.35–9.28)	1.46 (0.78–2.74)
1–2	1.31 (0.81–2.10)	0.85 (0.50–1.44)
3+	Referent	Referent
Insurance in last 12 month		
Insured continuously	Referent	Referent
Uninsured at some time	0.68 (0.48–0.95)	0.65 (0.47–0.90)
# Lifetime sexual partners		
1	Referent	Referent
2–3	1.96 (1.24–3.10)	1.50 (0.92–2.45)
4–9	1.57 (1.11–2.21)	1.22 (0.82–1.81)
10 or more	1.44 (0.88–2.36)	1.17 (0.72–1.91)
Sexual partner in last 12 months		
1	Referent	Referent
2	3.85 (2.58–5.76)	1.29 (0.87–1.90)
3+	2.57 (1.60–4.14)	0.81 (0.48–1.36)
Desires pregnancy in future		
Yes	2.82 (1.93–4.13)	0.98 (0.60–1.58)
No	Referent	Referent

and those who relied on the contraceptive vaginal ring were grouped together due to small numbers in each contraceptive subgroup. Participants who used either of the injectable contraceptives such as depot medroxyprogesterone acetate (DMPA) or combination injectable contraceptives were grouped together as “injectables.” Women who used either an intrauterine device (IUD) or the contraceptive implant were grouped together as users of long-acting reversible contraceptives (LARCs). And finally, those who relied on either female or male sterilization are grouped together in the “sterilization group.” In cases where respondents reported more than one contraceptive method, we chose the most effective method as defined by Trussell [12] as the primary contraceptive method. We then used this variable as a covariate in an independent multivariable logistic regression to evaluate the impact of primary method on dual-method use. All analyses were conducted in SAS (v. 9.2, SAS Institute, Cary, NC).

3. Results

An estimated 7.3% of US women reported dual-method use at their last intercourse in the last 12 months in the 2006–2008 NSFG. Over two-thirds of women reported a single-method of contraception and one-quarter reported no method used at the last intercourse (see Table 1). Ring users were most likely to report dual-method use with 32.6% dual use at last intercourse, whereas 21.7% of pill users, 16.7% of injectable users, and 16.0% of patch users reported dual-method use at last intercourse. Those relying on sterilization (4.4%) or currently using a LARC method (3.3%) were less likely to report dual-method use than women relying on less effective non-barrier contraceptive methods.

We examined the frequency of dual- and single-method use across demographic and clinical characteristics and found that rates of method use varied by age, race, ethnicity, education, marital status, pregnancy history, insurance status, and number of sexual partners (lifetime and past year; see Table 2). In particular, young women (15–20 years) who are at highest risk of both STI and unintended pregnancy reported the highest rates of dual-method use (22.8%). African American women had higher rates of dual-method use (9.4%) compared with Caucasian or Hispanic women. Education was associated with rates of dual-method use with the highest levels among women with some college education (12.0%). Never married women were most likely to report dual-method use (18.9%), as were nulligravid women (16.0%). Continuously insured women were more likely to report dual-method use (8.0%) than those with some period of no insurance (5.6%). Dual-method use was associated with sexual history (number of lifetime sex partners or in the past year) in the unadjusted analyses. We also examined the impact of future pregnancy intention on dual-method use. We found that women who “want a pregnancy at some time” were more likely to use dual-method protection in our unadjusted analyses.

Results of our logistic regression model are shown in Table 3. Potential confounders identified in the univariate

TABLE 4: Association of primary contraceptive method with dual-method use.

Primary contraceptive method	Crude	Adjusted
Pills	Referent	Referent
Patch/ring	1.40 (0.68–2.89)	1.15 (0.61–2.19)
Injectables (Lunelle/DMPA)	0.73 (0.44–1.23)	0.49 (0.28–0.85)
LARC	0.12 (0.06–0.24)	0.30 (0.14–0.63)
Sterilization	0.16 (0.10–0.25)	0.69 (0.39–1.22)

Note: controlled for age, race, ethnicity, level of education, marital status, gravidity, insurance status in the last 12 months, lifetime number of sexual partners, number of sexual partners in the last 12 months, and pregnancy intention.

analyses included age, race, ethnicity, level of education, marital status, gravidity, insurance status in the last 12 months, lifetime number of sexual partners, number of sexual partners in the last 12 months, and desire for future pregnancy. Women under the age of 36 were significantly more likely to report dual-method use compared to women in the 36–40 years age group. When compared to married women, never married women (OR_{adj} 6.5, 95% CI 3.6–11.5) and those who were widowed/divorced/separated (OR_{adj} 7.9, 95% CI 4.1–15.3) had the highest likelihood of dual-method use. Lack of insurance coverage during the prior year was associated with lower rates of dual-method use (OR_{adj} 0.7, 95% CI 0.5–0.9) compared to women who had continuous coverage. While desire for future childbearing was associated with dual use in our bivariate analysis (OR = 2.8, 95% CI 1.9–4.1), it was no longer significant in our logistic regression model (OR_{adj} = 1.0, 95% CI 0.6–1.6).

Since age and education are closely linked, we examined the results of the logistic regression model with and without age and education. Estimates of effect for age were largely unchanged by excluding education with the exception of the youngest category of women (15–20 year-olds) which was modestly attenuated.

Finally, we used a logistic regression model to examine the relationship of dual-method use by primary method of pregnancy prevention with pill users as the referent group, since pill use was the most common primary method reported (Table 4). After adjusting for all the factors associated with dual-method use from the prior adjusted analysis, women who relied on the contraceptive injection were less likely to report additional barrier use (OR_{adj} 0.5, 95% CI 0.3–0.9). LARC users were significantly less likely to report dual-method use (OR_{adj} 0.3, 95% CI 0.1–0.6). There was no statistically significant difference in the likelihood of dual use in male or female sterilization and patch/ring users compared to pill users.

4. Discussion

Our analysis indicated 7.3% of reproductive-aged women at risk for both pregnancy and STIs in this nationally representative sample reported using dual-method protection at last intercourse. Increased dual-method contraceptive use was associated with younger age and not being married,

but inversely associated with gaps in insurance coverage. A statistically significant lower rate of dual-method use was noted in women relying on the most effective forms of reversible pregnancy prevention: DMPA and LARC methods.

The 7.3% overall rate of dual-method use among the whole sample is consistent with previously published reports [6, 7]. It is encouraging to note the higher rate of dual-method use among teenagers and those under age 25 in this analysis as they have the highest incidence of STIs and unintended pregnancy. Sieving et al. noted a higher rate of two methods of contraception being used at most recent intercourse among older teens versus younger teens [8]. We found 22.8% of 15–20-year olds and 12% of 21–25-year olds reported dual-method protection. In a sample of women using LARC methods, Pazol et al. noted that high-school graduates were more likely than those without a high-school diploma to report condom use at last intercourse [13]. This is also consistent with our finding that higher educational levels are associated with dual-method use.

Few studies have evaluated factors associated with dual-method use. One study of adolescent girls noted that the strongest correlate of dual-method use was a desire to avoid pregnancy [14]. Impulsivity, self-esteem, social support, relationship status, partner communication, fear of condom negotiation, and desire to avoid unintended pregnancy have been associated with dual-method use among adolescents [14, 15].

Our finding of a positive association of dual-method use among respondents who are not currently married compared to married women is not surprising. Married women likely perceive less risk of STI acquisition and unintended pregnancy. This is consistent with other reports of lower rates of condom use among married women [4]. The lower rate of dual-method use reported among women who had a gap in insurance coverage during the past 12 months is likely due to limited access to prescription contraceptive methods or interruptions in continuity of care during these periods [16].

There is concern that women relying on LARC methods may have lower rates of barrier method use. Pazol et al. examined NSFG data from 2002–2003 and found that only 1.9% (95% CI 0.0–4.0) of respondents who reported using LARC methods also used a condom at last intercourse [13]. Our analysis also noted lower rates of dual-method use in women using LARC methods and DMPA. This lower rate may be due to these women feeling reassured that they have a highly effective contraceptive method and not recognizing their continued risk of STI acquisition.

A major strength of our study is that this data represents a national sample of reproductive-aged which reflects the experiences of approximately 44.5 million women in the United States. Our findings are more generalizable than studies that focus on adolescents or clinic-based samples. Our sample size provided sufficiently large numbers to assess differences in dual-method use across many exposure categories. However, there are some limitations of this analysis. Our estimate of 7% dual-method use may be a slight underestimate, as there are some women in the denominator of this analysis that may not be using dual methods or any

contraception due to a desire to conceive. Data regarding current contraceptive method was based on the respondents' reports of contraception at last intercourse which may be affected by both difficulty with recall and social desirability issues. It is difficult to extrapolate dual-method contraceptive use at last intercourse to dual use as a regularly practiced behavior. Additionally, the low number of women reporting using LARC, the patch, or ring for contraception reduces the level of precision of our estimates and makes it difficult to draw conclusions regarding women using these methods. Ideally, we would have liked to have examined other markers of high-risk sexual activity, such as a history of abortion or sexually transmitted infection, but we were limited by questions included in the NSFG survey and underreporting of abortions [17].

5. Conclusions

A small proportion of women who are at risk for unintended pregnancy and STIs use dual-method protection. We believe the findings from this study can be used to inform interventions to improve dual-method use. It is our hope that there will be increased access to prescription contraceptive methods due to the Department of Health and Human Services recommendations for contraceptive coverage [18]. This could alleviate the gaps in insurance coverage which we found to be associated with decreased rates of dual-method use. Our findings of the lowest rates of barrier use among users of the most effective reversible contraceptives (LARC methods and DMPA) suggest that women using these methods are an important group for intervention development to promote dual-method use. A comprehensive approach to educating women about risk factors for unintended pregnancy and STI acquisition along with methods of prevention is essential.

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